INFORMATION REQUEST RESPONSE

EA No: 0809-001 **Information Request No: AltNrth #13**

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Linkage to Other IRs

Review Board IR #12

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Request

Preamble:
The following statements are found in the DAR regarding mine reflooding:

> The resulting groundwater level will be at roughly 2/3 of the distance between the top and bottom of most of the arsenic chambers and stopes. Only one chamber (B230) will be completely submerged, and three (11, 12, and 14) will remain completely above the water table. (pg. 6-32)
>
> The alternative to surface storage is to store contaminated water in the underground mine workings. However, the combination of seasonal water treatment and underground storage would require large fluctuations in the minewater level during the year, repeatedly flooding and draining mine workings on several levels (approximately 100 m). Large fluctuations in the water level are likely to increase the release of arsenic from sources such as tailings and waste rock backfill, and could even cause uncontrolled movement of backfill and ground stability problems. (pg. 6-68 and 6-69)
>
> Allowing for the risk of much larger than normal freshet inflows may require drawing water down as far as the 425 Level. Although the mine pumping and water treatment systems will be designed to handle a range of flow rates, the mine must be used to store significant amounts of water on a temporary basis each year, in order to smooth the flow through the water treatment system and avoid the need for storage of contaminated water on surface. (pg. 6-71)

It appears that there is the potential for seasonal water level changes in the underground workings. The frozen blocks may be continually submerged and then dry again with some risks in nearby areas

where backfill and ground stability. This may become an issue and affect the ability to intentionally thaw out the frozen blocks.

Question:

1. Please provide a rationale for submerging the frozen blocks versus keeping the minewater below the lowest frozen block at all times.

2. Please provide a risk assessment for seasonal submergence and then lowering of minewater levels below the frozen blocks

3. Please consider and discuss the implications for seasonal fluctuations of minewater on the reversibility of the frozen block method.

Reference to DAR (relevant DAR Sections):

DAR s.6.8.2 Method Selection, Alternatives, and Preferred Method
6.8 Site Water Management

Reference to the EA Terms of Reference:

ToR s. 3.2.4(9)

Response 1 Summary

Current design criteria are to keep the groundwater elevation below the bottom of the arsenic chambers/stopes.

Response 1

Currently, mine water is controlled near the 750 level of the mine which is more than 100 m below the bottom of the arsenic chambers and stopes. At this level, seasonal fluctuations vary within about one metre of elevation. The design will be based on maintaining the mine water at the current level. Operating experience shows there is suitable mine water storage for current and future water treatment operations.

Response 2 Summary

Design criteria are to keep the mine water elevations relatively stable in the long term and below the arsenic chambers / stopes. Short term fluctuations will not negatively impact the frozen blocks.

Response 2

Maintaining the mine water elevation below the arsenic chambers/stopes and within a stable range will be the basis of design. There may be higher risks from large seasonal fluctuations of the mine water on

the stability of non-arsenic underground openings than to the frozen blocks. However, underground instability could eventually impact the frozen blocks.

Response 3 Summary

The design criteria are to maintain the mine water at about the current elevation near the 750 level. Mine water at this level will not reach the bottom of the chambers/stopes because of sufficient storage capacity within the mine for seasonal fluctuations. The seasonal fluctuations of mine water will not impact the reversibility of the frozen block.

Response 3

The design is to maintain the mine water at a relatively stable elevation at the 750 level, well below the arsenic chambers / stopes. Seasonal fluctuations at the current mine water elevation has been limited to about one metre over the past several years indicating suitable storage volume exists. Maintaining the mine water elevations at the current level will not have an impact on the reversibility of the frozen block.

The frozen blocks could be intentionally thawed at some point in the future. The drift plugs will be designed to withstand the full saturated hydrostatic head of arsenic water to ground surface and arsenic dust in the chambers/stopes with no water outside the plug.